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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,702	01/21/2004	Meng-Hung Chen	10113671	3361

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QUINTERO LAW OFFICE  
1617 BROADWAY, 3RD FLOOR  
SANTA MONICA, CA 90404

EXAMINER
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WARREN, MATTHEW E

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 03/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/761,702

Applicant(s)

MENG-HUNG CHEN

Examiner

Matthew E. Warren

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 10-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

This Office Action is in response to the Election filed on December 17, 2004.

#### ***Election/Restrictions***

Applicant's election without traverse of Group I, claims 1-9 in the reply filed on December 17, 2004 is acknowledged.

Claims 10-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 3E (APAF) in view of Maex et al. (US 6,323,555 B1).

In re claim 1, the APAF 3E shows a bit line contact structure, comprising: a substrate 100 having a transistor thereon, the transistor having a gate electrode 120, drain region 132, and source region 134; a dielectric layer 140, the dielectric layer having an opening 142 exposing the drain region; and a conductive layer in the opening. The APAF shows all of the elements of the claims except the dielectric being a

composite layer. Maex et al. shows (fig. 1H) a contact structure having a composite dielectric layer comprising a first dielectric layer 2, a barrier layer 3, and a second dielectric layer formed on the substrate. The first dielectric comprises a spin coating material (col. 1, line 62-col. 2, line 8). The composite dielectric has an opening exposing the surface of the substrate and a conductive layer 8 is formed therein. This configuration of composite interlayer dielectrics allows for a semiconductor device having a low-K dielectric with improved gap filling and planarization. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the dielectric layer of the APAF by forming a composite layer as taught by Maex to provide a semiconductor device having a low-K dielectric with improved gap filling and planarization.

In re the limitations of the claims concerning the “blanketly formed” and “spin-coating” dielectric and materials, those limitations are considered “product by process” limitations. A “product by process” claim limitation is directed to the product per se, no matter how actually made, In re Hirao, **190 USPQ 15 at 17**(footnote 3). See also in re Brown, **173 USPQ 685**; In re Luck, **177 USPQ 523**; In re Fessmann, **180 USPQ 324**; In re Avery, **186 USPQ 116** in re Wertheim, **191 USPQ 90 (209 USPQ 254** does not deal with this issue); and In re Marosi et al, **218 USPQ 289** final product per se which must be determined in a “product by, all of” claim, and not the patentability of the process, and that an old or obvious product, whether claimed in “product by process” claims or not. Note that Applicant has the burden of proof in such cases, as the above case law makes clear. “Even though product-by- process claims are limited by and defined by the

process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process.” In *re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985)(citations omitted).

In re claims 2, 4, and 6, Maex discloses (col. 6, lines 33-67) that the first dielectric is fluorinated polyimide, the barrier is SiN and the second dielectric comprises oxide (the second dielectric is made of the same materials as the first layer, which includes oxide).

In re claim 8, Maex discloses (col. 7, lines 20-25) that the conductive layer is copper.

In re claims 3, 5, 7, and 9, none of the references disclose the specific dimensions of the dielectric layers or the conductive layer. However, it would have been obvious to one of ordinary skill in the art to make the thickness of the dielectric layers and the conductive layer within the desired range, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. You et al. (US 6,677,679 B1) and Ueda (US Pub. 2001/0002731 A1) also disclose contact structures having composite dielectric layers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW  
*MEW*  
March 5, 2005

*GECKERT*  
GEORGE ECKERT  
PRIMARY EXAMINER